PROJECT PROGRESS REPORT

PREPARED FOR THE ALASKA ENERGY AUTHORITY BY
THE ALASKA CENTER FOR ENERGY AND POWER

PROJECT TITLE: *Round 2:* Emerging Energy Technology Fund – Data Collection

REPORTING PERIOD: 1rst Quarter 2017

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EETF Round 2 Projects

Air Source Heat Pumps, CCHRC

The air source heat pump project is complete, and no further data has been received. Final data analysis is in progress.

Trans-Critical CO_2 Heat Pump, Alaska Sea Life Center

The CO_2 heat pump continues to operate. Several events worthy of note have occurred during the past quarter. In mid-February, Andy Baker informed us the temperature in the building loop had been raised. This apparently caused the corrosion inhibitor inside the load side of the heat pump system to stop working. As a result, suspended iron filings gummed up the flow meters and caused erroneous readings. The Sea Life Center added more inhibitor to the system and installed a magnetic filter to remove the iron. The most recent data that ACEP has are from the end of February, which indicate that the flow meters were beginning to come back on line (see Figure 1 below).

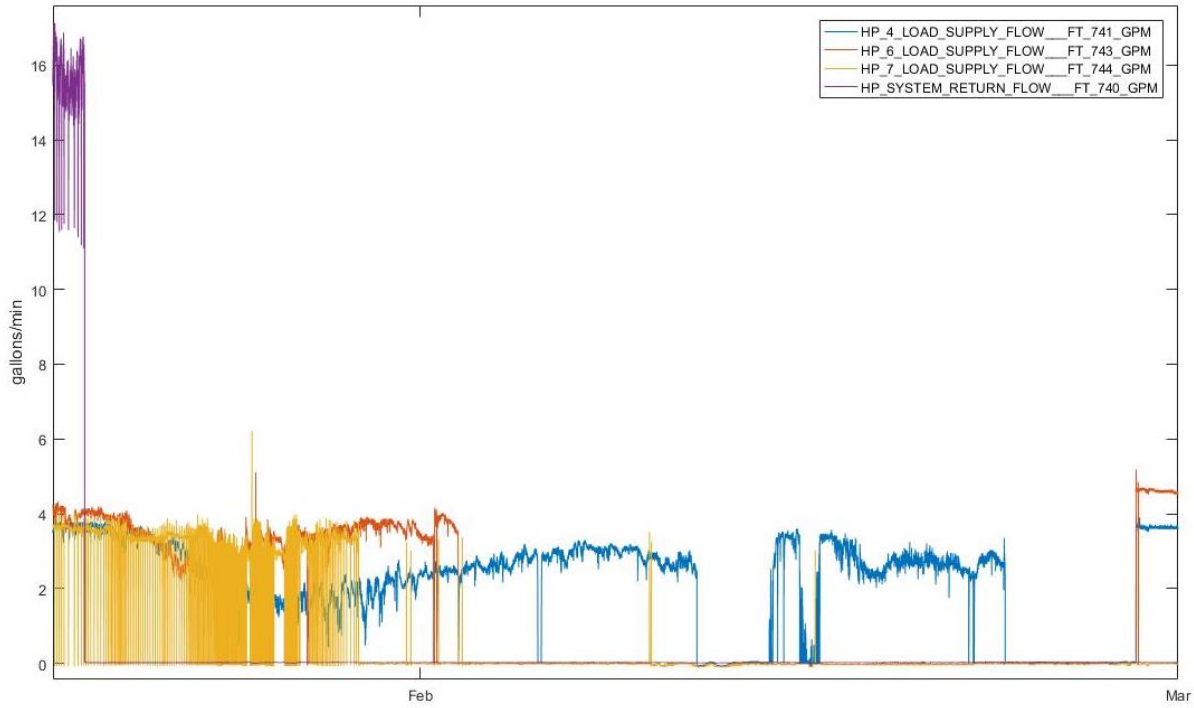

Figure 1. The flow rates of the heat pump supply side are shown in the graph above. It can be seen that, starting in late February, the flow rates became erratic. It appears that they began to return to normal at the end of February.

On March 1st, the data stream from the heat pump system became inconsistent. The building control system team at Trane was consulted and tried several fixes, none of which worked. Finally during the week of April 10th, a technician from Anchorage was able to diagnose the problem. Apparently the SQL data base storage limit was set up for 100 GB and had reached its limit. An additional hard drive was installed, and as this report is being written, data are just beginning to be sent to again to the ACEP server. Data from March and the first week of April were not logged by the Sea Life Center Trane system and were lost.

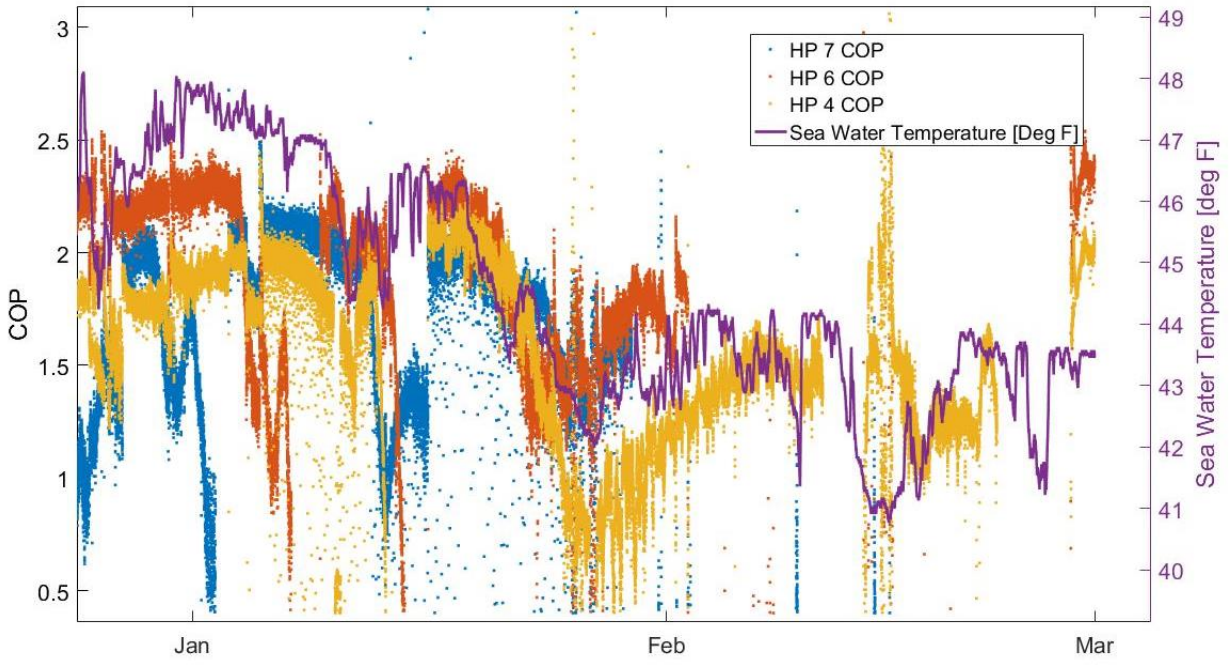

Figure 2. The heat pump COP is shown along with the sea water temperatures. The COP values appear to correspond closely to the sea water temperatures. The COP values became inconsistent starting in February due to the invalid flow readings described earlier.

Important data points as of early April:

- Currently sea water is at 39 degrees F
- Short term COPs for the heat pumps are between approximately 1.5 and 2.

Data will continue to be collected through at least May 1st, and a final analysis will be conducted.

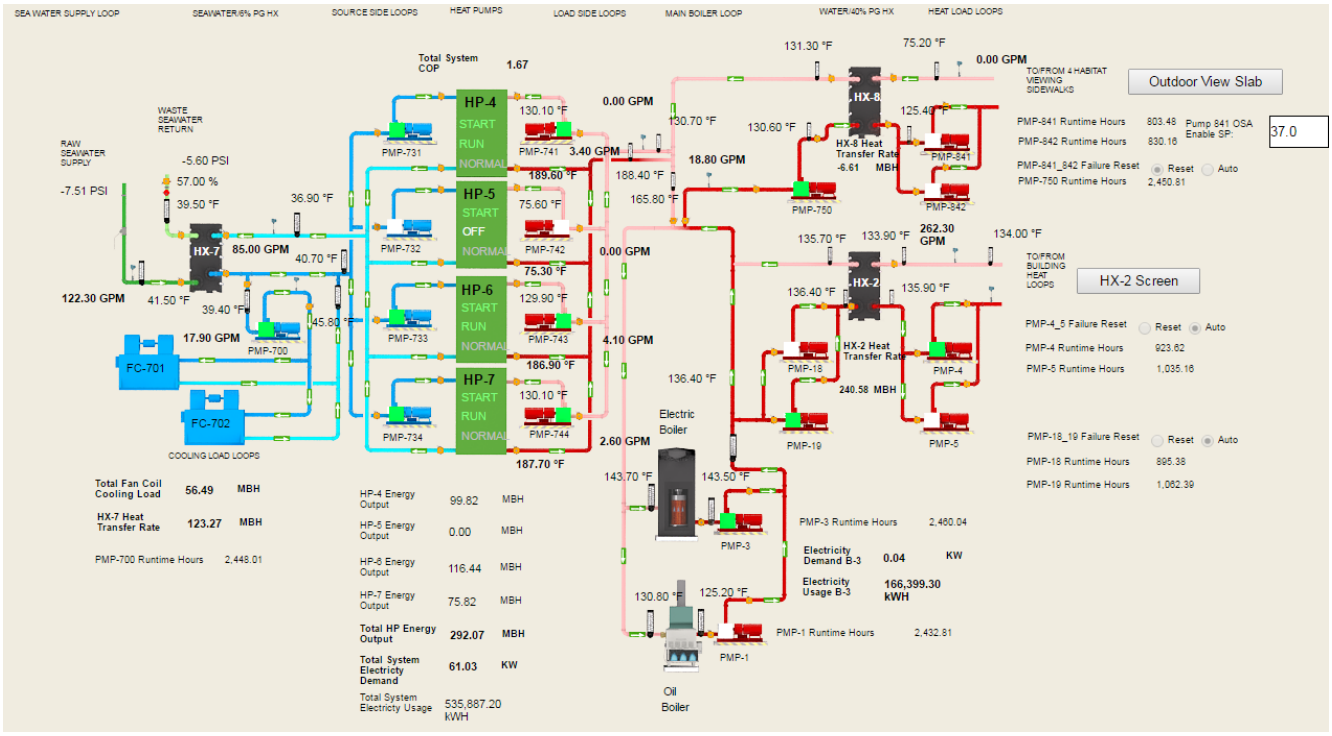

Figure 3. This system screenshot from April 12th shows that the heat pump system appears to be operating normally.

Multi-Stage Energy Storage System, Chugach Electric Association

ACEP has not received any updates from Chugach and will continue to reach out to project personnel.

St. Paul Flywheel Demonstration, TDX

The TDX FESS suffered a mechanical bearing failure in February 2016 and has not been brought back online. TDX continues to transmit data to ACEP on a regular basis. Further information may be obtained in person from ACEP, out of respect for the sensitivity around this topic.